

REMARKS

Upon entry of the instant amendment, claims 1-5 will remain pending in the above-identified application and stand ready for further action on the merits.

In the instant Amendment, claim 1 has been amended so that the term “stably” has been deleted and the claim’s language reformulated as to clarify the prior language of “*wherein the or each filter is simultaneously or separately taken out to the outside of said reactor-pipeline system and subjected to washing . . .*” as actual steps in the method of the present invention.

Accordingly, it is submitted that the present amendments to the claims do not introduce new matter into the application as originally filed. As such entry of the instant amendment and favorable action on the merits is earnestly solicited at present.

Claim Rejections under 35 U.S.C. § 112

Claims 1-5 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-5 are rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. , as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Reconsideration and withdraw of the above outstanding rejections is respectfully requested based on the following considerations.

In support of the outstanding 35 U.S.C. § 112, second paragraph rejection, the Examiner states that the term “stably producing” is ambiguous, and that, if the crux of the invention is

directed to the mechanical movement of the filter and not the process of making a polycarbonate, such may be better expressed as an apparatus claim.

However, As mentioned above, the term “stably” has instantly been deleted from claim 1, and claim 1 has been reformulated so as to clarify that “*wherein the or each filter is simultaneously or separately taken out to the outside of said reactor-pipeline system and subjected to washing ...*” actually means the steps of the method of the present invention.

As such, it is submitted that the instant amendments to claim 1 are sufficient to obviate the USPTO’s outstanding rejection under 35 U.S.C. § 112, second paragraph.

Further, it is submitted that the amendments are also sufficient to obviate the USPTO’s outstanding rejection under 35 U.S.C. 112, first paragraph.

Any contentions of the USPTO to the contrary must be reconsidered at present.

Claim Rejection under 35 U.S.C. § 103(a)

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pub. 2002/0032299 (see pages 1-8 in view of U.S. Pat. 4,134,964, col.5 lines 8-41).

Reconsideration and withdraw of the above rejection is respectfully requested based on the following considerations.

Legal Standard for Determining Prima Facie Obviousness

MPEP 2141 sets forth the guidelines in determining obviousness. First, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

- (a) determining the scope and content of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating any evidence of secondary considerations.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the Examiner has to provide some rationale for determining obviousness. MPEP 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

- (a) combining prior art elements according to known methods to yield predictable results;
- (b) simple substitution of one known element for another to obtain predictable results;
- (c) use of known technique to improve similar devices (methods, or products) in the same way;
- (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (e) “obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success
- (f) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See MPEP 2143.03.

Distinctions Over the Cited Art

Background (problems of the prior art):

“Contrary to the interfacial polycondensation process, the melt transesterification process has an advantage in that a solvent need not be used. However, in the melt transesterification process, the reaction must be performed under high temperature and high vacuum conditions, thus posing a problem in that the produced aromatic polycarbonate is likely to suffer a discoloration. In addition, since the viscosity of a molten polycarbonate is high, it is difficult to remove foreign matter, especially foreign matter particles having an extremely small size, from the polycarbonate. The foreign matter particles having an extremely small size are causatives of optical defects and, when the obtained aromatic polycarbonate is used in the optical application field, especially in the production of an optical disk, the presence of extremely small foreign matter particles contained in the polycarbonate causes a bit-error.” (See paragraph [0005] of the present specification.)

To solve this problem, various proposals have been made. For example, the following proposal has been made.

“As another proposal for reducing the amount of foreign matter contained in an aromatic polycarbonate, there can be mentioned a method in which an aromatic polycarbonate is produced using a reactor-pipeline system containing at least two reactors, wherein a filter is secured in a pipe of the reactor-pipeline system at a position upstream of a final reactor (see, for example, Patent Document 2). Further, there can be mentioned a method in which the above-mentioned reactor-pipeline system is provided with a filter switching device for switching between filters for alternative use in the reactor-pipeline system (see, for example, Patent Document 3). In this method, before performing a switching from a used filter to a new filter which are set in the filter switching device of the reactor-pipeline system, the new filter is subjected to washing with a washing agent which is an aromatic hydroxyl compound containing a basic compound, followed by discharge of the used washing agent to the outside of the reactor-pipeline system. After the discharge of the used washing agent, the used filter is switched to the washed new filter by the filter switching device. The amount of extremely small foreign matter particles contained in the produced aromatic polycarbonate was considerably decreased by this method.” (See paragraph [0005] of the present specification.)

However, this method has the following problem.

“However, in this method, it is necessary that a new filter set in the filter switching device be washed for a long period of time. Further, with respect to the aromatic polycarbonate obtained at the beginning of the production process which is started after the washing of the filter, the terminal hydroxyl group ratio is likely to be varied and, hence, a production loss is likely to occur.” (*See paragraph [0005] of the present specification.*)

Object of the present invention:

The object of the present invention is:

“...to provide a method for stably producing a colorless aromatic polycarbonate, wherein the method can be used to stably produce a high quality aromatic polycarbonate while solving the problems that an aromatic polycarbonate produced exhibits a great variation of terminal hydroxyl group ratio, the operation of the production equipment becomes unstable, and a marked product loss occurs due to a lowering of molecular weight or the like.” (*See paragraph [0006] of the present specification.*)

Features of the present invention:

As can be seen from instantly amended claim 1 of the present application, the present invention relates to a method having the following features (i) to (viii):

(i) method for producing an aromatic polycarbonate, which comprises continuously reacting an aromatic dihydroxy compound with a diaryl carbonate in a closed, reactor-pipeline system,

said closed, reactor-pipeline system comprising:

a plurality of reactors which are liquid-tightly connected through a pipeline toward an outlet for a final aromatic polycarbonate product, said pipeline comprising one or more pipes, wherein said plurality of reactors include at least two reactors connected in series, and

at least one filter secured in the pipe or pipes of said reactor-pipeline system,

said method further comprising:

- (ii) a step of simultaneously or separately taking out the or each filter to the outside of said reactor-pipeline system,
- (iii) a step of subjecting the or each filter to washing in the outside of said reactor-pipeline system, and
- (iv) a step of returning of the resultant washed filter into the inside of the pipe or pipes of said reactor-pipeline system,
- (v) wherein said washing is performed with the below-mentioned washing agents used in the following order:
 - (vi) an aqueous solution of a basic compound,
 - (vii) an aromatic monohydroxy compound, and
 - (viii) a molten mixture of an aromatic dihydroxy compound and a diaryl carbonate, said molten mixture containing a basic compound in an amount of from 1 to 10,000 ppb.

As described in paragraph [0007] of the present specification, in the present invention, “by the above-mentioned washing performed with the above-mentioned specific washing agents (namely an aqueous solution of a basic compound, an aromatic monohydroxy compound, and a molten mixture of an aromatic dihydroxy compound and a diaryl carbonate, the molten mixture containing a basic compound in an amount of from 1 to 10,000 ppb) which are used in the specific order”, the following excellent effects can be obtained:

“efficient cleaning of the filter while suppressing the variation of the terminal hydroxyl group ratio of the aromatic polycarbonate produced, thereby enabling stable production of a high quality aromatic polycarbonate”; and

“such effects of the method of the present invention are quite unexpected from the prior art”.

Thus, it is apparent that the above-mentioned features (v) to (viii) are technical features essential for achieving the unexpected excellent effects of the present invention. Further, such unexpected excellent effects are clearly substantiated in the working examples of the present application.

Comparison between the present invention and U.S. Pub. 2002/0032299

U.S. Pub. 2002/0032299 has the following descriptions:

“the present invention relates to a process for the production of an aromatic polycarbonate resin mainly by melt polycondensation method” (*see paragraph [0004]*);

“a filter having a retained particle size of 40 μm or less under a pressure difference of 20 kg/cm^2 or more” (*see claim 1*);

“an aromatic polycarbonate resin and molded article having excellent quality is obtained by efficiently removing the foreign matters with a polymer filter” (*see paragraph [0016]*)

From the above, it is apparent that U.S. Pub. 2002/0032299 discloses a method for efficiently removing foreign matters by a filter.

On the other hand, the present invention relates to a method in which the used filter(s) (clogged with foreign matters) is taken out from the production system and washed using specific washing agents in a specific manner (i.e., features (ii) to (viii) mentioned above), thereby achieving excellent effects (i.e., efficient cleaning of the filter while suppressing the variation of the terminal hydroxyl group ratio of the aromatic polycarbonate produced, thereby enabling stable production of a high quality aromatic polycarbonate).

U.S. Pub. 2002/0032299 has no teaching or suggestion about the above-mentioned features (ii) to (viii) of the present invention and the excellent effects achieved thereby.

Comparison between the present invention and U.S. Pat. 4,134,964

In the outstanding Office Action, the USPTO states as follows:

Although overall focus of the reaction in this reference is the production of another product, the reference does disclose the rotation of the filter, the washing of the filter and the returning of the filter to the apparatus to complete the process production.

However, it is submitted that the USPTO misunderstands the techniques of U.S. Pat. 4,134,964 and the present invention. As can be seen from claim 1 of U.S. Pat. 4,134,964, this reference relates to the "Process and apparatus for purifying wet-processed phosphoric acid" and has the following descriptions:

"The filter cake is preferably washed continuously on the filter with fresh water"
(*see col.4, lines 52-53*)

"The filter cake from the filter 16 is washed with fresh water coming from line 21, and thereafter passes to discharge means 20. The filtrate resulting from this washing leaves filter 16 through a line 18, and united in the collecting vessel 19 with the primary filtrate coming from the rotating filter through the line 17." (*see col.6, lines 14-16*)

"On the filter, which worked continuously, the retained dihydrate sludge was washed with 20.85 kg/h of fresh water." (*see col.7, lines 7-9*)

Thus, it is apparent that U.S. Pat. 4,134,964 only discloses an operation in which the phosphoric acid-containing filter cake is washed on a filter with water to thereby recover phosphoric acid in such a form as entrapped by the water, while leaving the filtrate on the filter. That is, this reference simply discloses a washing of a filter cake with water to recover the desired phosphoric acid, and has **no** teaching or suggestion about the washing of the filter *per se* to remove foreign matters adhered to and/or clogging the filter. Such a technique of USP 4134964 is too remote from that of the present invention which relates to a method in which the

used filter(s) (clogged with foreign matters) per se is washed using specific washing agents in a specific manner (i.e., features (ii) to (viii) mentioned above).

Combination of U.S. Pub. 2002/0032299 and U.S. Pat. 4,134,964

As mentioned above, neither U.S. Pub. 2002/0032299 nor U.S. Pat. 4,134,964 has any teaching or suggestion about the features (ii) to (viii) of the method of the present invention. Therefore, even if these two references are combined, the references would not render obvious the method of the present invention which has the above-mentioned features (v) to (viii) which are essential for achieving the excellent effects of the present invention.

From the above, it is apparent that the present invention is not anticipated nor obvious over the cited references, taken alone or in combination.

Based on the above considerations it is submitted that each of instantly pending claims 1-5 are allowable over the cited art of record at present. Any contention of the USPTO to the contrary must be reconsidered at present.

Conclusion

Based on the amendments and remarks presented herein, the USPTO is respectfully requested to issue a Notice of Allowance in the matter of the instant application clearly indicating that each of instant claims 1-5 currently under consideration is allowed and patentable under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey, Reg. No. 32,881 at

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the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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